

**REMARKS**

Claims 1, 6, 8-9, 13-14, 16, 20, 35, and 40 are amended. Claims 2 and 12 are canceled. Therefore, claims 1, 3-11, 13-20, 35, and 40 are pending in the case. Applicant asserts that the amendments do not raise new issues or matter. Upon entrance of the amendments, claims 1, 3-11, 13-20, 35, and 40 will be pending in the captioned application. Alternately, the amendments should be considered to place the case in better form for consideration on appeal. Entrance of the amendments and further examination and reconsideration of claims 1, 3-11, 13-20, 35, and 40 are respectfully requested.

**Section 103(a) Rejections**

Claims 1-12, 19-20, 35, and 40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,452,172 to Oi (hereinafter "Oi '172") in view of U.S. Patent No. 6,486,471 to Oi (hereinafter "Oi '471"). Claims 13-14 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oi '172 in view of Oi '471 and further in view of U.S. Patent No. 5,057,689 to Nomura et al. (hereinafter "Nomura"). Claims 15-16 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oi '172 in view of Oi '471 and further in view of U.S. Patent No. 6,188,071 to Gordon et al. (hereinafter "Gordon"). Claims 17-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Oi '172 in view of Oi '471 and further in view of U.S. Patent No. 5,194,808 to Shintaku et al. (hereinafter "Shintaku"). Claims 2 and 12 were canceled thereby rendering their rejections moot. As will be set forth in more detail below, the § 103(a) rejections of claims 1, 3-11, 13-20, 35, and 40 are respectfully traversed.

To establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond*, 910 F.2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). The cited art does not teach or suggest all limitations of the currently pending claims, some distinctive limitations of which are set forth in more detail below.

**The cited art does not teach or suggest a magnetic sensor disposed within a magnetic lens.** Amended independent claim 1 recites in part: "a magnetic sensor disposed within a magnetic field generated by the magnetic lens, wherein the magnetic sensor is further disposed within the magnetic lens."

Amended independent claims 20, 35, and 40 recite similar limitations. Support for the amendments to the claims can be found in the Specification, for example, on page 44, lines 20-22.

Oi '172 discloses a composite charged particle beam apparatus. Oi '172, however, does not disclose a magnetic sensor disposed within a magnetic lens. For example, Oi '172 states that "In order to solve the above-stated problem, a composite charged particle beam apparatus of the present invention has...a detector for magnetic field measurement capable of measurement of at least one direction component and memory means are provided within the sample chamber." (Oi '172 -- col. 1, lines 52-59). As shown in Fig. 1 of Oi '172, the prior art apparatus includes "magnetic field detector 9 provided in the sample chamber." (Oi '172 -- col. 2, lines 29-30). In addition, as shown in Fig. 1 of Oi '172, magnetic field detector 9 is not disposed within electron beam lens barrel 2. Therefore, the magnetic field detector of Oi '172 is not disposed within a magnetic lens. Consequently, Oi '172 does not teach a magnetic sensor disposed within a magnetic lens.

The Final Office Action states that "Oi [172] teaches all aspects of the claim except for explicitly stating the magnetic sensor being disposed within a cavity in the magnetic lens." (Final Office Action -- page 6.) The Examiner relies upon Nomura to teach this limitation of the claims and states that "it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the magnetic sensor being disposed within a cavity in the magnetic lens,...in order to obtain a more precise/stronger reading of the magnetic field in order to adjust the magnetic field more precisely and therefore provide better focusing of the beam due to the magnetic field adjustments." (Final Office Action -- pages 6-7). Applicant respectfully traverses this assertion.

In particular, Oi '172 teaches that residual magnetism in the path of a focused ion beam will cause deterioration in the focused ion beam resolving power (Oi '172 -- col. 1, lines 24-35) and that the object of the prior art invention is to control the magnetic field leaked from an electron beam lens barrel to a focused ion beam path (Oi '172 -- col. 1, lines 41-48). In particular, Oi '172 states that "Based on a measurement value of a magnetic field detector provided within a sample chamber, the magnetic field in the focused ion beam path is controlled." (Oi '172 -- col. 1, lines 62-64). Therefore, the magnetic field detector is purposefully positioned in the sample chamber (not within the magnetic lens of the electron beam lens) to measure and control the magnetic field in the focused ion beam path. As such, contrary to the assertion of the Examiner, it would not be obvious to one of ordinary skill in the art to move the magnetic field detector of Oi '172 into the electron beam lens since the magnetic field detector is specifically used to measure and

control the magnetic field in the focused ion beam path, which is external to the electron beam lens barrel, as shown in Fig. 1 of Oi '172. Consequently, one of ordinary skill in the art would be motivated to position the magnetic field detector proximate the focused ion beam path, external to the electron beam lens barrel, as taught by Oi '172 to provide more precise measurements of the magnetic field in the focused ion beam path to provide better control of the magnetic field in the focused ion beam path.

For at least the reasons set forth above, Oi '172 does not suggest or provide motivation for a magnetic field sensor disposed within a magnetic lens. In particular, Oi '172 specifically teaches that an object of the prior art invention is to prevent resolving power deterioration of the focused ion beam due to magnetic field leakage into the path of the focused ion beam. (Oi '172 -- col. 1, lines 41-48). Therefore, it will be obvious to one of ordinary skill in the art that moving magnetic field detector 9 of Oi '172 from a position proximate the focused ion beam path to a position within a magnetic lens will render the prior art invention of Oi '172 being modified unsatisfactory for its intended purpose. As a result, there is no suggestion or motivation to modify the prior art invention of Oi '172 as suggested in the Final Office Action. If proposed modification would render the prior art invention being modified unsatisfactory for its intended purposes, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). MPEP 2143.01. Consequently, there is no suggestion or motivation to modify the prior art invention of Oi '172 by combination with Nomura or any of the other cited art to teach a magnetic sensor disposed within a magnetic lens.

Moreover, modifying the prior art invention of Oi '172 as suggested in the Final Office Action would change the principle of operation of the prior art invention. For instance, by moving the magnetic field detector of Oi '172 into the magnetic lens of the electron beam lens barrel, the prior art invention of Oi '172 would be modified such that instead of the magnetic field in the focused ion beam path being measured and controlled, the magnetic field within the electron beam lens barrel would be measured and controlled. In particular, by placing the magnetic field detector of Oi '172 in the electron beam lens barrel, accurate measurements of the magnetic field in the focused ion beam path would not be possible since as known to one of ordinary skill in the art, the magnetic field inside of a magnetic lens will be different than the residual magnetism external to the magnetic lens. The teachings of Oi '172 describe these differences in the magnetic field internal and external to the magnetic lens by stating that "if an excitation current of an objective lens of an electron beam lens barrel is rendered 0, the residual magnetism does not become 0." (Oi '172 -- col. 1, lines 29-31). Therefore, even if the magnetic field in a magnetic lens is 0, the residual magnetic field external to the magnetic lens is not 0. Consequently, modifying the prior art teachings of Oi

'172 by combination with Nomura as suggested in the Final Office Action would change the principle of operation of the prior art invention. As a result, the teachings of the cited art are not sufficient to render the claims *prima facie* obvious. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). MPEP 2143.01.

Furthermore, for at least the reasons set forth above, the prior art does not suggest the desirability of modifying the position of the magnetic field detector of Oi '172 as suggested in the Final Office Action. Therefore, even if Oi '172 can be modified as suggested in the Final Office Action, the resultant modification is not obvious. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). MPEP 2143.01.

For at least the reasons provided above, Oi '172 does not teach, suggest, or provide motivation for a magnetic sensor disposed within a magnetic lens, as recited in claims 1, 20, 35, and 40, and cannot be combined with any other prior art to overcome deficiencies therein. Therefore, the cited art does not teach or suggest all limitations of claims 1, 20, 35, and 40.

The cited art also does not teach or suggest a magnetic sensor configured to generate an output signal that is responsive to a magnetic field strength of a magnetic field generated by a magnetic lens that will be applied to a charged particle beam traveling through the magnetic lens. Amended independent claim 1 recites in part: "wherein the magnetic sensor is configured to generate an output signal during use, wherein the output signal is responsive to a first magnetic field strength of the magnetic field generated by the magnetic lens, and wherein the magnetic field will be applied to a charged particle beam traveling through the magnetic lens." Amended independent claims 20, 35, and 40 recite similar limitations. Support for the amendments to the claims can be found in the Specification, for example, on page 47, lines 1-15.

For at least the reasons provided above, modifying the prior art invention of Oi '172 such that magnetic field detector 9 is configured to measure a magnetic field generated by a magnetic lens that will be applied to a charged particle beam traveling through the magnetic lens will render the prior art invention being modified unsatisfactory for its intended purpose, which is to measure and control the residual

magnetic field external to the magnetic lens in a focused ion beam path. As such, there is no suggestion or motivation to combine or modify the teachings of Oi '172 with any other prior art to teach a magnetic sensor that is configured to generate an output signal that is responsive to a magnetic field strength of a magnetic field generated by a magnetic lens that will be applied to a charged particle beam traveling through the magnetic lens, as presently claimed. Consequently, Oi '172 does not teach, suggest, or provide motivation for the claimed magnetic sensor, as recited in claims 1, 20, 35, and 40, and cannot be combined with any other prior art to overcome deficiencies therein. Therefore, the cited art does not teach or suggest several limitations of claims 1, 20, 35, and 40.

For at least the reasons stated above, claims 1, 20, 35, and 40, as well as claims dependent therefrom, are patentably distinct over the cited art. Accordingly, removal of the § 103(a) rejections of claims 1, 3-11, 13-20, 35, and 40 is respectfully requested.

### CONCLUSION

This response constitutes a complete response to the issues raised in the Final Office Action mailed October 5, 2004. In view of remarks traversing rejections, Applicants assert that pending claims 1, 3-11, 13-20, 35, and 40 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

No fees are required for filing this amendment; however, the Commissioner is authorized to charge any additional fees which may be required, or credit any overpayment, to deposit account number 50-3268/5589-00301.

Respectfully submitted,



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Date: December 3, 2004